



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/GB96/03099 (22) International Filing Date: 13 December 1996 (13.12.96) (30) Priority Data: 9525753.1 15 December 1995 (15.12.95) GB (71) Applicant (for all designated States except US): NORTHERN TELECOM LIMITED [CA/CA]; World Trade Center of Montreal, 8th floor, 380 St. Antoine Street West, Montreal, Quebec H2Y 3Y4 (CA). (72) Inventors; and (75) Inventors/Applicants (for US only): DOWNING, Anthony, Harold [GB/GB]; 4 Railey Road, Saffron Waldon, Essex CB11 3EN (GB). JONES, David, Richard [GB/GB]; 112 Clive Road, Pencisely, Cardiff CF5 1GN (GB). LAYCOCK, John [GB/GB]; 6 Windsor Close, Alton, Hants GU3 1QU (GB). (74) Agent: RYAN, John, Peter, William; Nortel Patents, London Road, Harlow, Essex CM17 9NA (GB).		(81) Designated States: US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>Without international search report and to be republished upon receipt of that report.</i>
(54) Title: INTERACTIVE SERVICES (57) Abstract An arrangement for providing interactive services between a service provider (100) and a subscriber. A subscriber telephone terminal (120) receives display data over a telephone network (101, 102, 103) from the service provider (100). A graphics device (130) couples to terminal (120) for processing the display data and generating a video signal for display on a subscriber's display device (150). Terminal (120) also has a telephone keypad and a response generator for enabling a subscriber to generate responses for conveying back over the telephone network to service provider (100). Display data may be transported as modem tones, and subscriber responses as DTMF tones.		

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INTERACTIVE SERVICES

TECHNICAL FIELD

5 This invention relates to the provision of interactive services to subscribers over telephone lines, and to terminal equipment to allow subscribers to use such services.

BACKGROUND OF THE INVENTION

10 There is an increasing demand for interactive services such as home banking and home shopping. Typically subscribers who use such services are presented with information on some form of display device and offered a number of choices. The subscriber's choice determines the subsequent information which is displayed. As an example, a home banking service may present an initial menu of services (view balance, pay bills, transfer funds) and then respond to whatever service a user requests.

15 It is known to use telephone lines to deliver interactive services to dedicated terminals at a subscriber's premises. The terminal is often a computer equipped with a modem for bi-directional communication over a telephone line. The computer also has a display for a user to view information and a keyboard for a user to enter responses.

20 A recent protocol called ADSI (Analog Display Services Interface) devised by Bellcore defines an alternative way of providing interactive services over telephone lines. Special telephone terminals have an in-built scrollable display with a set of soft keys alongside the display. Soft keys are labelled with functions, these functions being updated as the user progresses through the service. A terminal which supports the ADSI protocol is described in the Applicants' pending United Kingdom patent

application GB-2,285,897-A, and illustrated in an article entitled "ADSI : The Dawn of a new age of interactive services" by Lois Andreasen et al, published in the Bell Northern Research journal "Telesis" Issue 97, December 1993.

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One of the main features of the ADSI protocol is the combination of voice and interactive data services using an off-hook signalling protocol. ADSI terminals have a high unit-cost because of the requirements for a screen, screen memory, and equipment to support the new signalling protocol.

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Other types of screen-phones for use in accessing interactive services are shown in Patent Applications WO 94/27258 A1 and WO 95/06384 A1.

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While there is considerable consumer interest in having access to interactive services in the home, success of such services is dependent upon the cost of the equipment which is needed in the home.

The present invention seeks to provide an alternative arrangement for enabling a subscriber to access interactive services.

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SUMMARY OF THE INVENTION

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According to the present invention there is provided an arrangement for enabling the provision of interactive services between a service provider and a subscriber, the arrangement comprising a subscriber keypad telephone terminal arranged to receive display data over a telephone network from the service provider, and a graphics device coupled to the terminal for processing the display data whereby to generate a video signal for display on a subscriber's television or monitor, and wherein the terminal comprises a response generator coupled to the keypad of the terminal to enable the subscriber to generate responses for conveying back over the telephone network to the service provider.

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According to another aspect of the invention there is provided an arrangement for enabling the provision of interactive services between a service provider and a subscriber, the arrangement comprising a subscriber telephone terminal arranged to handle voice calls and to receive display data over a telephone network from the service provider,

and a graphics device coupled to the terminal for processing the display data whereby to generate a video signal for display on a subscriber's television or monitor, and wherein the terminal comprises a response generator to enable the subscriber to generate responses for conveying
5 back over the telephone network to the service provider.

According to a further aspect of the invention there is provided a method of providing interactive services between a service provider and a subscriber, comprising transmitting display data from the service provider
10 over a telephone network to a subscriber, receiving the display data at a subscriber's keypad telephone terminal, coupling the display data to a graphics device, processing the display data at the graphics device whereby to generate a video signal and displaying the video signal on a subscriber's television or monitor and conveying to the service provider
15 subscriber responses generated by the subscriber using the telephone keypad and a response generator within the terminal.

This has the advantage of offering interactive services to subscribers without the need for subscribers to have dedicated terminal equipment or
20 a personal computer acting as a terminal. It also avoids the need for an expensive screen-phone as in the ADSI system. The use of a subscribers existing television set or monitor reduces the cost of equipment which is needed. It also provides a large, easy-to-read display which can readily display text and colour graphics which has advantages over the
25 monochrome liquid-crystal displays used in ADSI screen-phones.

Preferably the display data is in the form of modem tones and the subscriber's telephone terminal has a demodulator to decode the tones. Preferably the modem tones are of the format used to send calling line
30 identification (CLI) information to a terminal, the terminal being operable to use the demodulator to detect bursts of CLI or the display data. This also has an advantage of saving cost of the equipment.

Preferably the response generator comprises a multi-frequency tone generator. This type of generator is a standard component of a modern
35 telephone terminal as it is used to generate signalling tones at call set-up.

Transport between the service provider and subscriber preferably comprises a series of cycles, each cycle comprising a handshaking period, a display data transmission period, and a subscriber response transmission period, with the terminal buffering subscriber responses during the handshaking and display data transmission periods. This protocol prevents subscriber keypresses interfering with the transmission of incoming display data.

The graphics device preferably includes a teletext generator for converting the display data into a teletext image. Teletext offers text and limited graphics in colour. Teletext compiles a display from a series of character codes and therefore requires a minimum of data to construct an image. Thus a complete screen of information can be presented after a short delay and requires only a small memory device to store the image. The graphics device may be incorporated into a cable television or satellite television set-top box. Incorporating the graphics device into the set-top box has the advantage of using an existing on-screen text generator, and further reduces the cost of implementing this service.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention will now be described by way of example only, with reference to the accompanying drawings, in which:

Figure 1 schematically shows an arrangement for providing interactive services in accordance with the embodiment of the invention;

Figure 2 shows a telephone terminal used in the arrangement of figure 1 in more detail;

Figure 3 shows a graphics device used in the arrangement of figure 1 in more detail, and;

Figure 4 shows the interface between the telephone terminal and graphics device of figures 1 to 3 in more detail;

Figure 5 shows a preferred form of signalling protocol for delivering interactive services between the service provider and subscriber of figure 1.

DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 schematically shows a system according to the embodiment of the present invention. A service provider 100 such as a bank, is coupled

by telephone network 101, 102, 103 to a subscriber's telephone terminal 120. Line 103 between subscriber terminal 120 and exchange 102 may comprise a standard local subscriber loop. The telephone network may be provided as part of a cable television (CATV) network. Communication
5 between service provider 100 and subscriber terminal 120 is in two directions; a forward path 104 from service provider 100 to subscriber terminal 120, and a return path 105 from subscriber terminal 120 to service provider 100. Terminal 120 is adapted to process interactive services, in a manner which will be further described. Terminal 120 is also
10 coupled to a graphics device 130. A video signal is delivered from the device to a television set 150 directly 131, or in the case of cable TV or satellite TV customers, via a set-top box 140.

The incremental cost of providing this service is based almost solely on
15 the cost of producing the graphics device 130.

While the cheapest option for providing link 121 between telephone 120 and graphics device 130 is by cable, it may alternatively be achieved by a wireless link such as a low power radio or infra-red link.

20 A domestic television or monitor is used to provide the subscriber's display output whilst the telephone keypad is used as the subscriber's input device. To connect to a service the subscriber places the telephone into display service mode and dials a service. Both of these functions will
25 normally be effected by a single press of a programmable or dedicated key on the terminal. The calling line identity of the subscriber's terminal is received by the service provider. As a security measure, the CLI is checked against a PIN which the subscriber is asked to enter. After a short delay to transmit display data, the information is displayed on a
30 television set 150 along with menus. The subscriber uses the number, hash and star keys of the terminal keypad to request menu items and enter information such as account numbers. The subscriber can terminate the call to the service at any time in the usual manner, such as by lifting and dropping the handset or pressing the release key.

35 Preferably the telephone terminal 120 is a telephone offering Custom Local Area Signalling Services (CLASS) which has been modified to

- 6 -

process interactive services. These telephones contain the receiving function of a modem i.e. a frequency shift key decoder, which is used to receive Calling Line Identification from the exchange. The tones and timing used for this are compatible with those of a CCITT V23 modem transmitting at 1200 baud, but there is no provision in conventional telephones for a return channel from the telephone or even of filtering in the telephone to protect the received data from any returned signals.

A return path to convey user responses to the service provider is provided using DTMF tones. The protocol which multiplexes the forward and return paths will be described in more detail later.

Service provider 100 typically has a modem pool (not shown) to allow communication with a number of subscribers over the telephone network. Modems typically are able to detect modem tones and DTMF tones, and there will therefore be minimal cost in upgrading existing modem control software at the service provider to adapt to this new method of transport.

Figure 2 is a block diagram of the terminal 120 shown in figure 1. Subscriber telephone line 103 is coupled to transmission and handsfree block 210 and caller ID demodulator 250. Caller ID demodulator decodes FSK tones which are used to send caller identification information and display data for the information services. In addition, the demodulator 250 also detects the 1300Hz modem handshaking tone. Dialler circuit 260 generates DTMF tones in response to keypresses, under the control of microcontroller 200. Memory 240 is used, *inter-alia* to store subscriber keypresses during certain periods during display service mode.

Operation of all blocks within the terminal is controlled by microcontroller 200 which has an associated memory 240. Interface 220 which couples terminal 120 to the graphics device comprises a serial data output port having data output line, control line, and a power line. This is conveniently an RS232 interface.

Software modifications to the telephone allow modem standard handshaking to be used. In particular, a software modification allows the telephone to detect the 1300Hz hand-shaking tone sent by the service

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provider. A further software modification allows microcontroller 200 to generate a 390Hz tone to reply to the service provider. These software modifications add a negligible cost to the telephone.

- 5 The main hardware modification to the telephone is to opto-isolate the interface where data is passed on to graphics device 130.

Figure 3 shows a preferred form of the graphics device 130 in more detail. Serial data at 1200 baud is passed along data line 300 to the device.
10 Micro-controller 310 receives the data and toggles the control line to the telephone. Data is formatted for teletext display and written into a teletext display generator 320. The link between micro controller 310 and teletext generator 320 may be an I²C bus. Teletext generator 320 issues an RGB signal which is encoded to PAL, or some other colour format, before
15 modulation onto a suitable UHF carrier. It will be appreciated that the video signal may be tapped in the RGB or baseband PAL form for direct coupling to a suitably equipped display device. The graphics device is powered by a low voltage supply from a suitable mains transformer.

20 Figure 4 shows the interface between terminal 120 and graphics device 130 in more detail. The link between the two devices comprises a data line (DATA), control line (CONTROL) and a power line. The data line and control line between terminal 120 and graphics device 130 are electrically isolated by opto-isolating circuits 410, 420 in terminal 120 to provide
25 protection to and from the PSTN. Power line (POWER) provides a power supply from the graphics device to the terminal to power the opto-isolating circuits 410, 420. Conveniently, the terminal is provided with a second handset jack, the link between the terminal and graphics device comprising a 4-way cord having an RJ-11 plug at the terminal end and a
30 4-way line-jack plug at the graphics device end.

UHF output 350 may be coupled directly to a UHF aerial input of a television set. Alternatively, it may be coupled to the television set via the UHF input of a video or a cable television or satellite television set-top box.
35

In setting-up the system, the user connects terminal 120 to graphics device 130 and switches television set/monitor 150 to an appropriate

channel to receive the output of the graphics device. The user then powers up the graphics device and watches for a default greeting message on the television. Graphics device 130 monitors link 121 to check if terminal 120 has been properly connected. In the state where the terminal is connected but no display data is being transmitted, the data line is held low. If the graphics device detects that the data line is held high then it displays a message such as "Plug in Phone", this message being stored in memory (not shown) associated with micro controller 310. A further check is performed when the user selects the auto-dial key to select the interactive service. Terminal 120 monitors the control line (CONTROL) to check if graphics device 130 has been properly connected. If the graphics device has not been connected, then the terminal will display a message "No Display Unit".

The transport protocol for delivering services will now be described in more detail, with reference to figure 5. Figure 5 shows the signalling for five parts of the system over a common time period. The parts of the system shown are (i) the service provider, (ii) the Customer Premises Equipment (CPE) or subscriber's telephone terminal, (iii) keypresses, (iv) signalling between the CPE and graphics device, and (v) the graphics device.

Microcontroller 200 monitors the duration of the 1300Hz tone (defined in the V23 standard as 300ms to 700ms).

A customer places the telephone into the display service mode and auto-dials the display service by pressing a programmable key. The display service provider is equipped with a V23 modem and hence expects the normal call set-up/handshaking detailed in the standard, namely, the display service sends a 1300 Hz tone which is detected by the telephone. Microcontroller 200 monitors the duration of the 1300Hz tone (defined in the V.23 standard as 300ms to 700ms). The telephone responds with a 390 Hz tone. In this protocol the 390 Hz tone is only sent long enough for the display service modem to enter the carrier detect/data transfer mode, as a continuous tone could interfere with the wanted data reception. At this time any keypresses are buffered to prevent interference with the set-up signalling. The data is sent at 1200 baud FSK by the display service

modem to the telephone where it is demodulated into a baseband serial data stream. The terminal passes the data stream to the graphics device. On recognising valid data the graphics device raises a control line which is then dropped at the end of a block of valid data.

5

On identifying the falling edge of the control line the terminal is allowed to dial out any buffered key presses as DTMF tones to the display service. At all other times keypresses are buffered so as not to interfere with data transfer. If, whilst dialling out the buffered keys, the user dials any other
10 keys these are also dialled out. Once the key buffer has emptied the terminal enters key buffering mode. As the key presses are buffered and sent under control of the telephone as opposed the user (see line (iii)), the delay between each DTMF transmission is fixed and hence the display service provider receiving these can identify when no tones are received
15 within a fixed period that the transmission is complete. Typically the service provider operates a 150ms lack of tone time-out. When dialling out buffered keypresses, the terminal controls the duration of the DTMF tones corresponding to each keypress. The cycle of handshaking and data transfer described above then resumes. During periods when the
20 display service has no data to send, a no operation (NOP) data package is sent to the terminal and on to the graphics device. This ensures the control line continues to be toggled and hence any key presses will be released from the telephone buffer. In addition it ensures that all devices participating in the protocol can expect an action to occur within a
25 quantifiable period and they can then take action, such as notifying the user, if communication appears to be lost.

30

Both the service provider 100 and subscriber equipment maintain counters for a time-out period to monitor for a disruption to the service.

While using the service, the telephone handset and handsfree microphone and speaker are muted so that a user will not hear the modem and DTMF tones.

35 A CLASS telephone is capable of receiving V.23 data. A software modification allows the telephone to receive the longer bursts of screen data, rather than the usual short burst of caller identification data. A

further software/hardware modification allows the telephone to detect the 1300 Hz tone from the service provider. Another software modification allows the telephone to generate a 390 Hz tone. Software modifications add a negligible cost to the telephone.

5

The graphics device may be supplied as a stand-alone unit or incorporated into the set-top box of a cable TV installation. A set-top box often incorporates a teletext generator to issue on-screen commands to a user and may also be used to display the interactive service information.

10 A combination of the set-top box and graphics device will therefore reduce the cost of the equipment required to support this form of transport still further.

15

Alternatively, the graphics device may be incorporated into the telephone terminal, such that the terminal outputs a video signal for direct connection to a television or monitor.

20

One form of service for which this arrangement will be particularly suited is that of home-banking, where features such as viewing an account balance and recent account transactions, paying bills and transferring funds can be easily achieved.

25

A further service which can be implemented is that of connection to the Internet for browsing the World Wide Web (WWW). For this, the service provider acts as a gateway to the Internet. On the forward path to the subscriber the gateway receives Hypertext (HTML) display pages and translates them to teletext pages which, when received by a subscriber's telephone, can be passed to the graphics device and correctly interpreted.

30

Internet information pages contain linkwords which, when selected, lead the user on to another page. Users who access the Internet through a PC use a mouse to highlight these linkwords. Subscribers who use a conventional telephone keypad for their responses cannot select linkwords in this manner. One solution is to provide the telephone with a pointing device. An alternative solution is to provide each page of information with a translated table of menu commands. The translated menu provides a list of keys corresponding to linkwords appearing in the original HTML

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display pages. By pressing one of these keys the subscriber can progress through the service. On the return path from the subscriber the service provider converts a subscriber's keypress to a selection of a particular Hypertext linkword. A connection to the Internet is therefore provided at a low cost to a subscriber. Preferably four of the user-programmable keys of terminal 120 are colour-coded and are programmed to generate responses to the gateway. The colour of the keys corresponds to colour-coded linkwords in the teletext display. To enable a subscriber to make alphanumeric responses to pages the terminal may be provided with an extended keypad of alphanumeric keys.

The output teletext display is restricted to 40 columns and 25 rows. Each character cell can contain a character derived from the Teletext character set. Combinations of characters can be used to form graphics and coloured effects in the standard manner of Teletext displays. Rather than supporting sideways scrolling, and adding to the complexity of the control process, text is always word-wrapped. This output display is mapped onto a virtual output page that is 40 columns but an effectively unlimited number of rows.

The range of responses that a subscriber can make on his terminal is limited to the number keys 0-9 and the '#' and '*' symbols on the terminal keypad. With the use of colour-coded programmable keys on the terminal, code sequences '*0' through '*3' are used to 'trigger' HTML anchors. The four programmable keys are coloured red, green, yellow and cyan. The anchor/input on the display is coloured to match the key. Anchors/inputs that are visible but have no matching key are coloured magenta. The '#' code is interpreted to mean 'more'. This steps the page to the next logical state downwards, either the next set of four anchors/inputs, or the next page of the text, or both. When the last page of the document is reached the next step returns to the start.

Each document is given two pseudo anchors, 'home' and 'back', present at the bottom of the last page. 'Home' has the effect of returning to the 'home page'. This is the first page that the system presents and is configured in the gateway. 'Back' returns to the previous page. The return

stack is of necessity limited in size and so cannot be guaranteed available. The 'home' command is always available.

- 5 Graphics that have Teletext equivalents are pasted onto the page. Where graphics do not have Teletext equivalents HTML '' tags are inspected to check if they have a an associated 'alt' field containing text. This will be used to replace the image should there not be a Teletext equivalent of the image.

CLAIMS

1. An arrangement for enabling the provision of interactive services between a service provider and a subscriber, the arrangement comprising a subscriber keypad telephone terminal arranged to receive display data over a telephone network from the service provider, and a graphics device coupled to the terminal for processing the display data whereby to generate a video signal for display on a subscriber's television or monitor, and wherein the terminal comprises a response generator coupled to the keypad of the terminal to enable the subscriber to generate responses for conveying back over the telephone network to the service provider.
2. An arrangement according to claim 1 wherein the display data is in the form of modem tones, the subscriber's telephone terminal having a demodulator to decode the tones.
3. An arrangement according to claim 2 wherein modem tones are of the format used to send Calling Line Identification (CLI) information to a terminal, the terminal being operable to use the demodulator to detect bursts of CLI or the display data.
4. An arrangement according to any preceding claim wherein the response generator comprises a multi-frequency tone generator.
5. An arrangement according to any preceding claim arranged such that transport between the service provider and subscriber comprises a series of cycles, each cycle comprising a handshaking period, a display data transmission period, and a subscriber response transmission period and wherein a buffer at the terminal buffers subscriber responses during the handshaking and display data transmission periods.
6. An arrangement according to any preceding claim wherein the graphics device includes a teletext generator for converting the display data into a teletext image.
7. An arrangement according to any preceding claim wherein the graphics device is incorporated into a set-top box.

- 14 -

8. An arrangement according to claim 7 wherein the set-top box is a cable television set-top box.
9. An arrangement according to claim 7 wherein the set-top box is a satellite television set-top box.
10. An arrangement according to any preceding claim wherein the graphics device is coupled to the terminal by a wireless link.
11. An arrangement according to any preceding claim wherein the graphics device generates a video signal which is modulated onto a UHF carrier for coupling to a UHF input of the subscriber's television.
12. An arrangement according to any one of claims 1 to 6 wherein the graphics device is incorporated into the telephone terminal.
13. An arrangement for enabling the provision of interactive services between a service provider and a subscriber, the arrangement comprising a subscriber telephone terminal arranged to handle voice calls and to receive display data over a telephone network from the service provider, and a graphics device coupled to the terminal for processing the display data whereby to generate a video signal for display on a subscriber's television or monitor, and wherein the terminal comprises a response generator to enable the subscriber to generate responses for conveying back over the telephone network to the service provider.
14. A method of providing interactive services between a service provider and a subscriber, comprising transmitting display data from the service provider over a telephone network to a subscriber, receiving the display data at a subscriber's keypad telephone terminal, coupling the display data to a graphics device, processing the display data at the graphics device whereby to generate a video signal and displaying the video signal on a subscriber's television or monitor, and conveying to the service provider subscriber responses generated by the subscriber using the telephone keypad and a response generator within the terminal.

15. A method according to claim 14 wherein the subscriber responses to the service provider are in the form of multi-frequency tones.

5 16. A method according to claim 14 or 15 wherein transport between the service provider and subscriber comprises a series of cycles, each cycle comprising a handshaking period, a display data transmission period, and a subscriber response transmission period, and wherein the terminal buffers subscriber responses during the handshaking and display data transmission periods.

10

17. A method according to claim 16 wherein during the handshaking period the service provider transmits a first tone to the terminal, and the terminal, in response to correctly detecting the first tone, generates a second tone to transmit to the service provider.

15

18. A method according to claim 16 or 17 wherein if the service provider has no display data to send, a data packet is sent to the terminal during the display data transmission period.

20

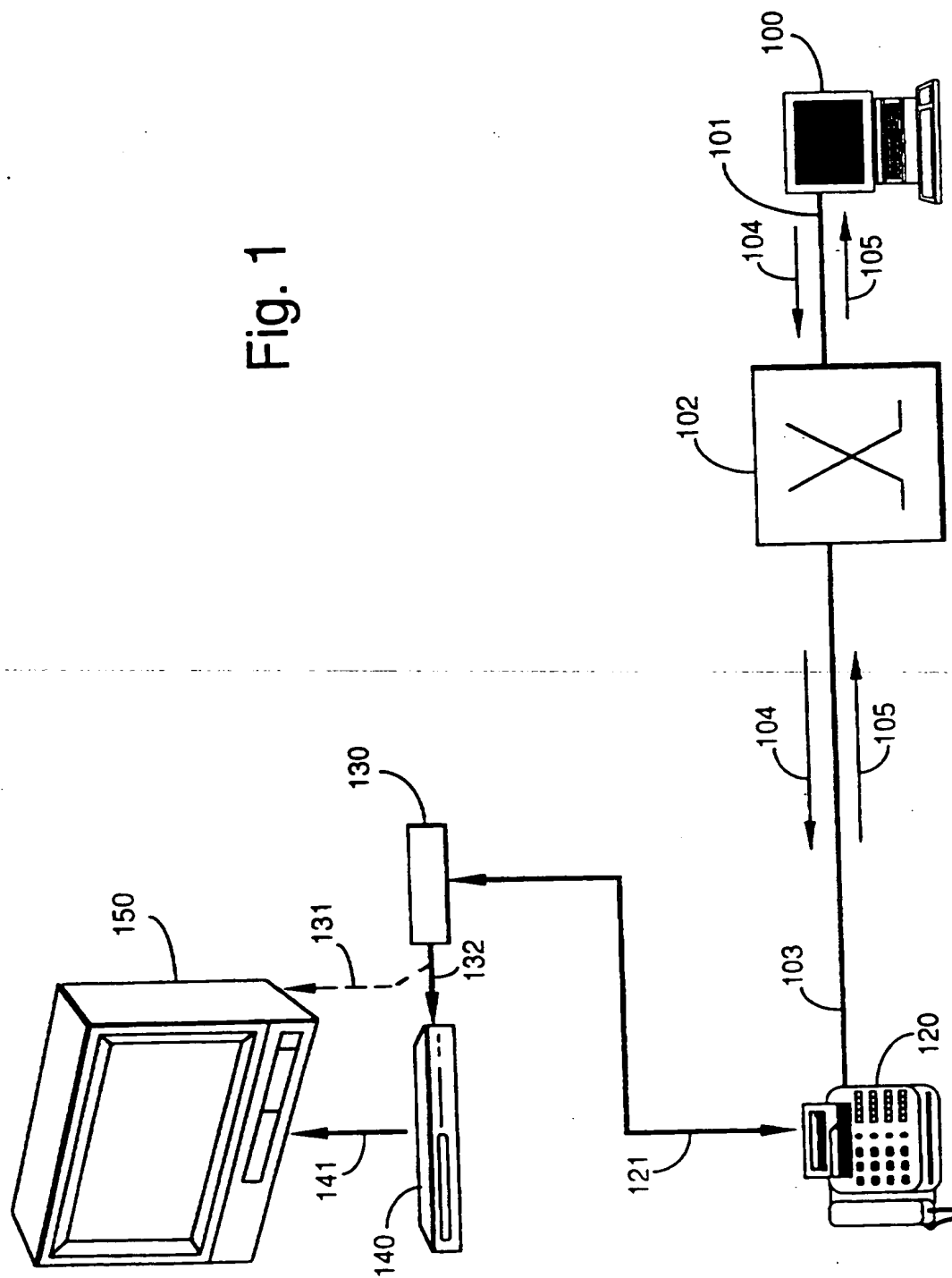
19. A method according to any one of claims 16 to 18 wherein a control line links the graphics device to the terminal, the graphics device signalling on the control line the end of the display data transmission period to inform the terminal of the start of the subscriber response transmission period.

25

20. A method according to any one of claims 15 to 19 wherein the modem tones are transmitted according to CCITT V23 standard.

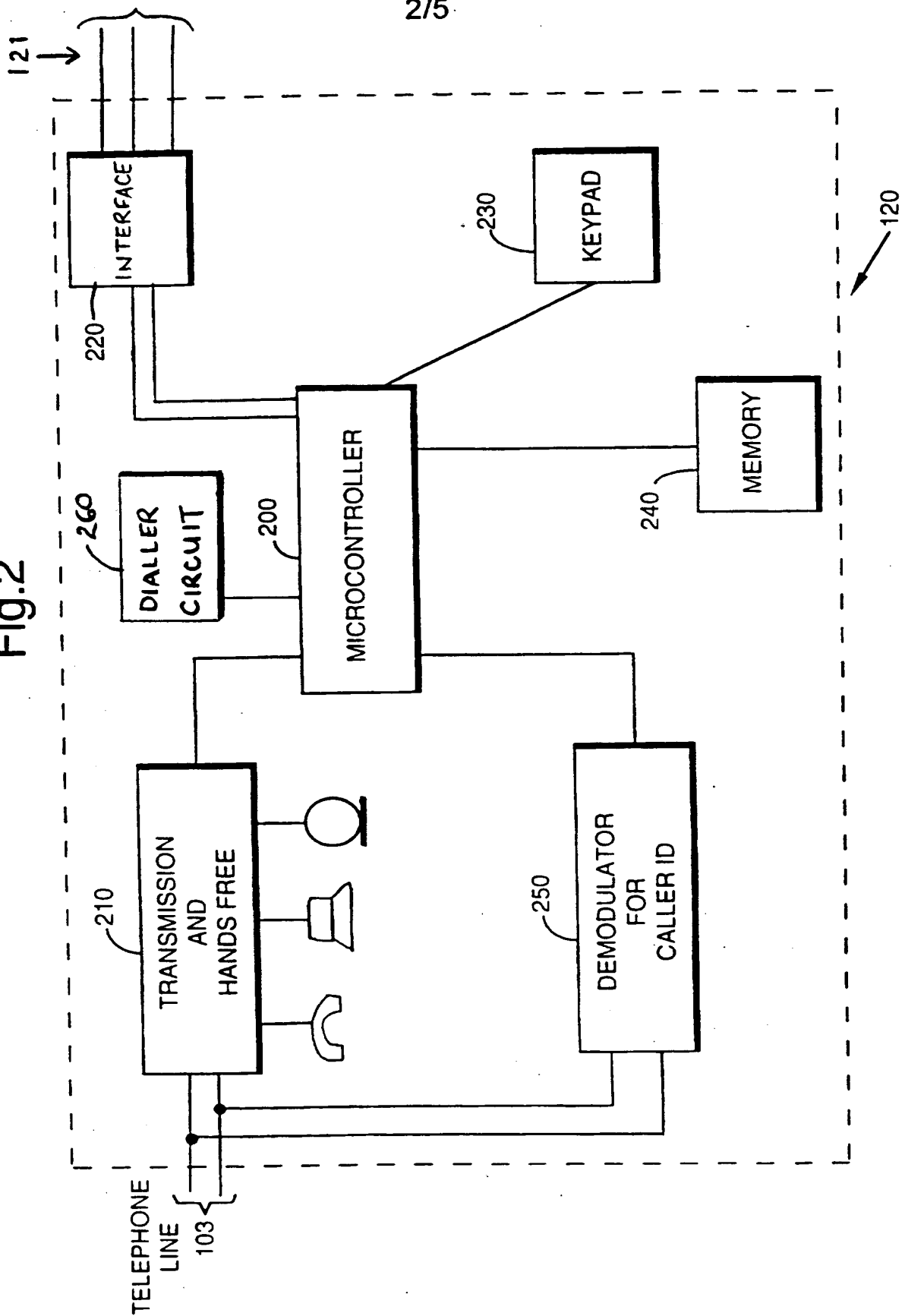
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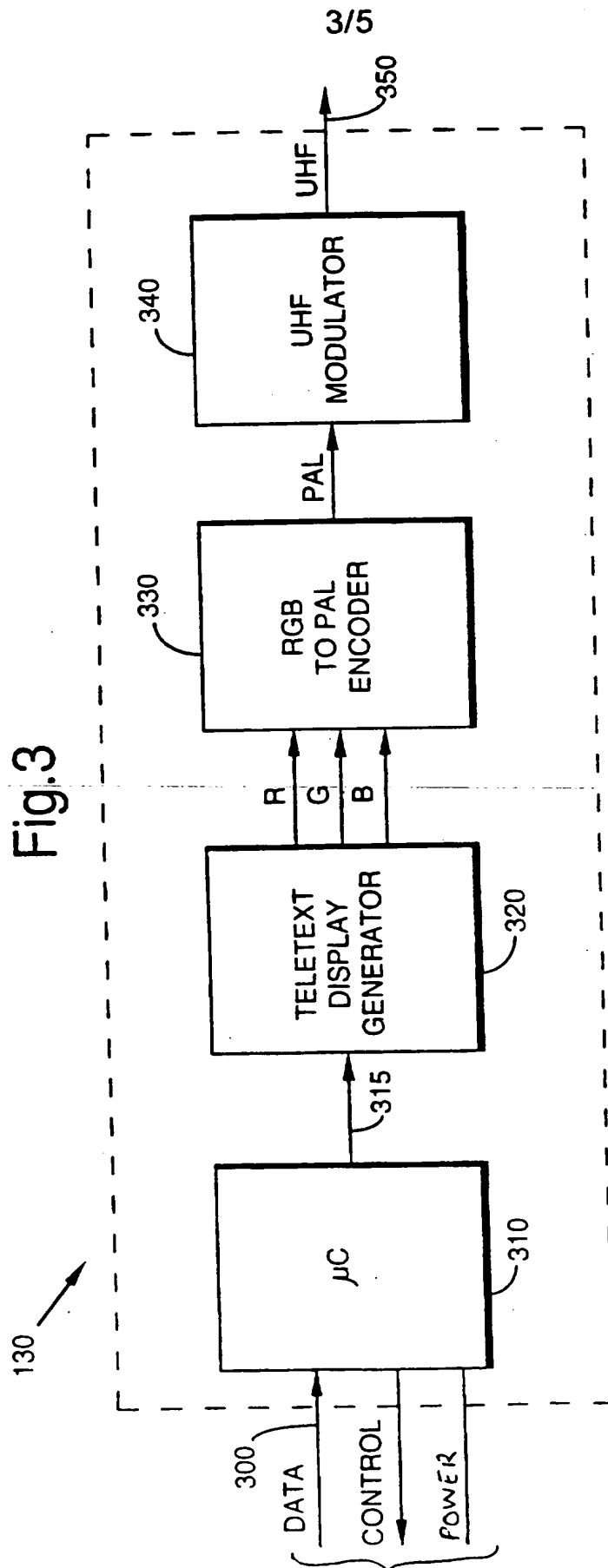
Fig. 1



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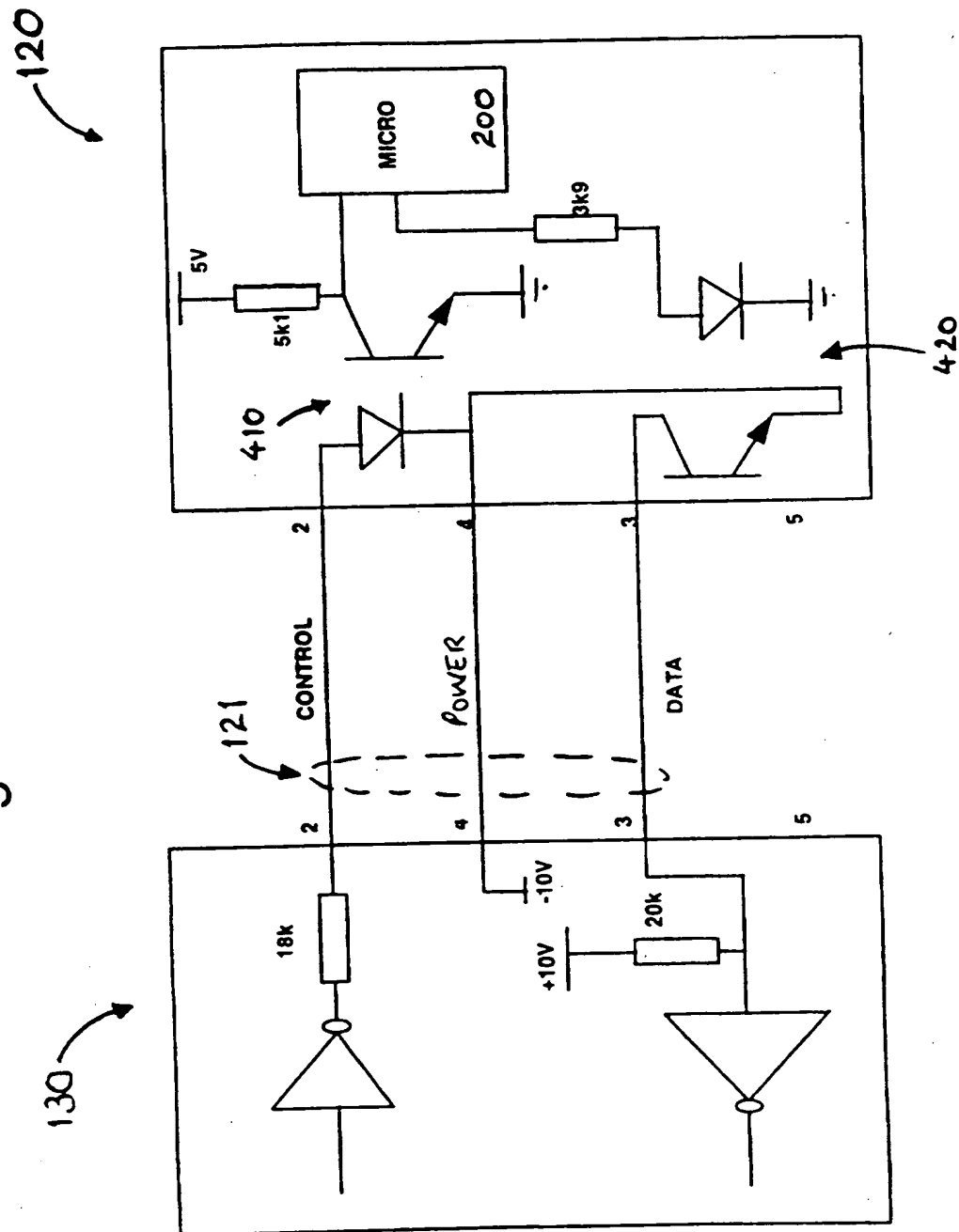
Fig.2





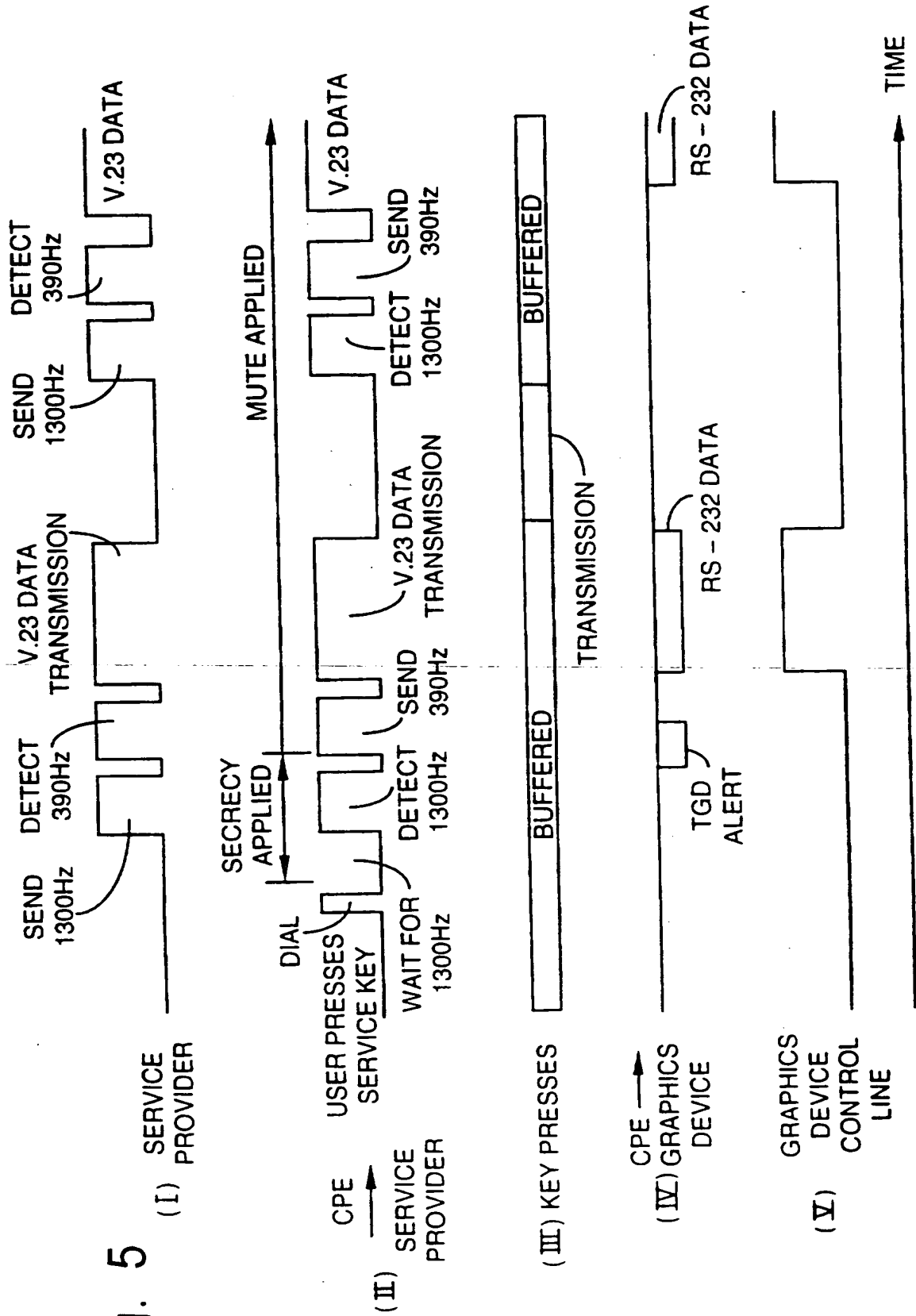
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Fig. 4



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Fig. 5

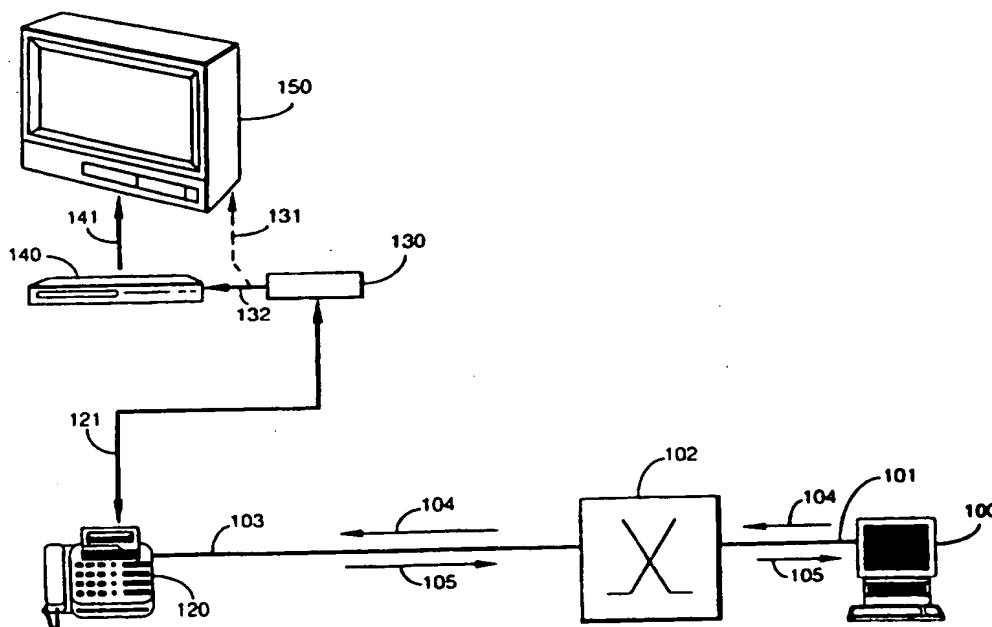




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(54) Title: INTERACTIVE SERVICES



(57) Abstract

An arrangement for providing interactive services between a service provider (100) and a subscriber. A subscriber telephone terminal (120) receives display data over a telephone network (101, 102, 103) from the service provider (100). A graphics device (130) couples to terminal (120) for processing the display data and generating a video signal for display on a subscriber's display device (150). Terminal (120) also has a telephone keypad and a response generator for enabling a subscriber to generate responses for conveying back over the telephone network to service provider (100). Display data may be transported as modem tones, and subscriber responses as DTMF tones.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 96/03099

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04M3/50 H04M11/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 94 24802 A (BELLSOUTH CORP) 27 October 1994 see abstract see figures 3,5-10,12,30A see page 16, line 35 - page 18, line 8 see page 41, line 1 - line 10 ---	1,2,4,5, 12-16
X	WO 93 01665 A (MOTOROLA INC) 21 January 1993 see abstract see figures 1-3,6 ---	1,10,13, 14
X	TELESIS, no. 97, December 1993, pages 35-50, XP000616855 ANDREASEN L ET AL: "ADSI: THE DAWN OF A NEW AGE OF INTERACTIVE SERVICES" see the whole document ---	1-4, 13-15
-/-		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

26 June 1997

Date of mailing of the international search report

07.07.97

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 96/03099

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P,X	US 5 550 649 A (WONG JOHN J ET AL) 27 August 1996 see figures 1,5A-6B see abstract ---	1-3, 13-17
A	WO 94 21084 A (KATZ RONALD A) 15 September 1994 cited in the application see abstract see page 43, line 18 - page 44, line 16 see figure 1 ---	1,2,4, 12-15
A	DE 32 07 022 A (SIEMENS AG) 8 September 1983 see figure 1 see page 11, line 13 - page 12, line 32 ---	1,8
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 96/03099

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